

### **REMARKS**

Applicant has amended claims 9, 11, 13, 16 and 21 and has cancelled claim 15, with this first Office Action Response. Applicant is not conceding in this patent application that the original claims are not patentable over the art cited by the Examiner, since the claim amendments are only for facilitating expeditious prosecution of this patent application. Applicant respectfully reserves the right to pursue the original claims, and other claims, in one or more continuations and/or divisional patent applications.

### **35 U.S.C. § 112**

The Examiner rejected claims 12 and 13 under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

The Examiner first stated: “Concerning claim 12, it is unclear how both ends of the spiral conveyor can be connected to the hopper and the material feeding pipe.” Applicant would like to point out that the limitation referred to by the Examiner is actually found in claim 11 rather than claim 12. Thus, Applicant has amended claim 11 to read that “one end of the spiral conveyer (14) is connected with the hopper (1) and the other end of the spiral conveyor (14) is connected with the material feeding pipe (4), for delivering materials into the grinding casing.” Now it is clear that both ends of the conveyor are not connected to both the hopper and the material feeding the pipe. One end is connected to the hopper, and the other end is connected to the conveyor. Applicant therefore respectfully contends that currently amended claim 11 is in compliance with 35 U.S.C. 112, second paragraph.

The Examiner secondly stated: “Concerning claim 13, line 2 refers to one inner flange plate but line 4 makes claims at least one. Further it is unclear if the inner and outer flange plates are at both the left and right side of the casing or one on the left and the other on the right.” Applicant has amended claim 13 to read that “the grinding casing (21) is provided with two inner flange plates (12) and two outer flange plates (13), wherein one inner flange plate (12) and one outer flange plate (13) are positioned at the left side of the grinding casing (21) and the other inner flange plate (12) and the other outer flange plate (13) are positioned at the right side of the grinding casing (21).” It is now clear that there is an inner flange plate and an outer flange plate

on each of the left and right side of the grind casing. Applicant therefore respectfully contends that currently amended claim 13 is in compliance with 35 U.S.C. 112, second paragraph.

**35 U.S.C. § 102(b)**

The Examiner rejected claims 1 – 7 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,065,697 to Engel et al., hereinafter “Engel.” Regarding claim 1, the Examiner stated:

... *Engel* discloses a bi-negative pressure turbine (24) which comprises a base plate (60) and a plurality of blades (64, 65) provided both at both sides of the base plate and having the same spiral orientation, wherein the blades are uniformly arranged in a circumference direction of the base plate; and the blades at one side of the base plate are able to alternate with those at opposite sides (see Figure 5 which shows blades on each side of the base plate since there is another set of blades on the base plate below).

Office Action, page 2 – 3.

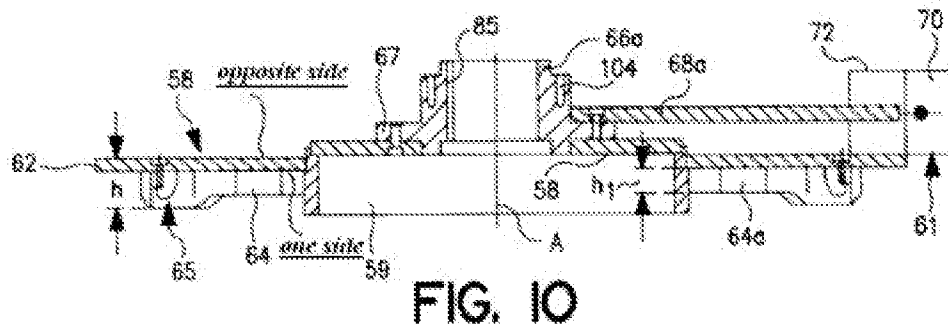
Applicant respectfully contends firstly that Engel **does not** disclose a bi-negative pressure turbine. According to column 6, line 3 of Engel’s description, and Figures 1 and 2, element number “24” indicates a “cylindrical housing,” rather than a turbine. No where in Engel is there mention of a turbine, let alone a bi-negative pressure turbine.

It is generally known by those skilled in the art that a bi-negative pressure turbine means a turbine which can produce two negative pressures. According to the present invention, there is a plurality of blades positioned at both sides of the base plate with an alternate mode, such that two negative pressures in the form of a vortex are formed at both sides of the grinding casing when the turbine is rotated at a high speed. However, none of the turbines in the cited art can produce two negative pressures.

It is also understood by those skilled in the art that when bi-negative pressure turbines are applied to a high turbulence mill, a strong turbulence can be formed by the two negative pressures so as to effectively achieve the turbulence milling. In fluid dynamics, turbulence or turbulent flow is a fluid regime characterized by chaotic, stochastic property changes. This

includes low momentum diffusion, high momentum convection, and rapid variation of pressure and velocity in space and time. Flows with high Reynolds numbers (e.g.  $Re > 1.5 \times 10^5$ ) usually become turbulent. Mixing is hugely enhanced and surface shear stresses are much higher in turbulent flows as compared to corresponding laminar flows. In the present invention, the high turbulence is used to grind materials. When solid materials to be crushed are exposed to a high turbulence field, a gas-solid two-phase flow will be formed. The turbulence energy from the turbine is transferred gradually from larger vortexes to smaller vortexes by an inertia effect generated by a rotation at a high speed. As a result, materials are effectively crushed due to violent impact, self-grinding effect, and shear effect generated due to the complicated turbulence. Thereby, the bi-negative pressure turbine as well as the high turbulence mill can produce nano-material. This is different from the conventional mechanical grinding equipment, jet mill and oscillating mill failing to use the strong turbulence. Engel, for example, does not disclose this bi-negative pressure turbine and discloses a separating or breaking up apparatus to obtain the material between 5 to 50mm.

Furthermore, according to column 6, line 61 of Engel's description, and Figure 10 (shown below), the "blades (64, 65)" are provided only at the under surface of the "base plate (60)" but not at both sides of the "base plate (60)." That is, Engel **does not** disclose "a plurality of blades (64, 65) provided at both sides of the base plate," as required by claim 1. Thus, Engel **does not** disclose "the blades at one side of the base plate are able to alternate with those at the opposite side."



Still further, Engel does indicate a rotor, which may or may not function as a turbine. However, this element is absolutely not a bi-negative pressure turbine, and is therefore inferior to the present invention in the ways described hereinabove.

For at least the above reasons, claim 1 is respectfully submitted to be not anticipated by Engel under 35 U.S.C. §102(b). Additionally, because claims 2 – 7 depend from claim 1, applicant respectfully submits that claims 2 – 7 are not anticipated by Engel under 35 U.S.C. §102(b) for at least the reasons cited above. Therefore, reconsideration and withdrawal of the rejection of claims 1 – 7 are respectfully requested.

**35 U.S.C. § 103(a)**

The Examiner rejected claim 8 under 35 U.S.C. 103(a) as being unpatentable over Engel in view of U.S. Patent No. 6,179,234 to Marshall et al., hereinafter “Marshall.” Applicant respectfully contends that claim 1 is in condition for allowance in light of the remarks above. Therefore, because claim 8 depends from claim 1, Applicant likewise respectfully contends that claim 8 is in condition for allowance.

The Examiner further rejected claims 9, 12 – 22 under 35 U.S.C. 103(a) as being unpatentable over Engel in view of U.S. Patent Application No. 2003/0098374 to Kang, hereinafter “Kang.” With respect to independent claim 9, the Examiner stated:

...Engel discloses a high turbulence mill (10) comprising: a drive device (20) provided on a base (18) and inherently comprising a motor and a driving shaft (21) coupled with said motor; a hollow grinding case (24) arranged above the base; a bi negative pressure turbine (24) rotatably mounted within the grinding case and driven by the driving device; a hopper (32) for delivering the material via a material feed pipe (34); a material discharge pipe (38) communicated with the grinding case; and a control device (the apparatus is inherently controlled by some device).

Office Action, page 5. Applicant has amended claim 9 to further include the limitations found in the original claim 15. Original claim 15 was rejected in the Office Action by the Examiner for the same reasons as stated in the rejection of claim 1. Applicant respectfully contends that currently amended claim 9 has been amended to include all of the technical features of original claim 1, and is therefore patentable for at least the reasons described hereinabove. Since claims 12 – 22 are dependent on claim 9, Applicant respectfully submits that claims 12 – 22 are not unpatentable over Engel in view of Kang. Therefore, reconsideration and withdrawal of the rejection of claims 9, 12 – 22 are respectfully requested.

The Examiner also rejected claim 10 under 35 U.S.C. As being unpatentable over Engel in view of Kang and in further view of U.S. Patent No. 3,688,991 to Andrews, hereinafter

“Andrews.” Since claim 10 is dependent on claim 9, Applicant respectfully submits that claim 10 is not unpatentable over Engel in view of Kang and in further view of Andrews. Therefore, reconsideration and withdrawal of the rejection of claim 10 is respectfully requested.

The Examiner still further rejected claim 11 under 35 U.S.C. As being unpatentable over Engel in view of Kang and in further view of U.S. Patent No. 3,978,978 to Herter, hereinafter “Herter.” Since claim 11 is dependent on claim 9, Applicant respectfully submits that claim 11 is not unpatentable over Engel in view of Kang and in further view of Herter. Therefore, reconsideration and withdrawal of the rejection of claim 11 is respectfully requested.



## **CONCLUSION**

Based on the preceding arguments, Applicant respectfully believes that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicant invites the Examiner to contact Applicant's representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account 19-0513.

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